

U.S. Patent Application No. 09/658,046  
Reply to Office Action dated September 13, 2005

PATENT  
450100-02700

### **IN THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

#### **Listing of Claims**

1. (Currently Amended) An image pickup apparatus comprising:

an image pickup element having a color coding filter;

a preprocessing circuit comprising (i) means for generating signals based on output from each line in the image pickup element and for outputting the same; (ii) spatial phase synchronization means for synchronizing horizontal and vertical spatial phases based on the output from each line in the image pickup element; and (iii) synthesis means for generating a synthesized signal based on a signal whose horizontal and vertical spatial phases are synchronized in the spatial phase synchronization means;

a brightness processing circuit which receives the outputted signals from the means for generating signals and performs brightness processing thereon; and

a chromatic processing circuit which receives the synthesized signal from the synthesis means and performs color processing thereon,

wherein said outputted signals are delay signals sent to said preprocessing circuit containing a plurality of adders which compiles a sum of said delay signals and a  $\frac{1}{2}$  multiplier which halves the sum compiled from said plurality of adders,

wherein said preprocessing circuit outputs said sum halved by said  $\frac{1}{2}$  multiplier to said brightness processing circuit, and

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wherein said preprocessing circuit sends said delay signals as the synthesized signal from the synthesis means to said chromatic processing circuit.

2. (Original) An image pickup apparatus according to claim 1,  
wherein the color coding filter is a complementary mosaic color coding filter.
3. (Original) An image pickup apparatus according to claim 2,  
wherein the complementary mosaic color coding filter is based on a repetition of two pixels horizontally by four lines vertically, and wherein the filter comprises:
  - a first line which is an alternate repetition of Cy (cyan) and Ye (yellow);
  - a second line which is an alternate repetition of G (green) and Mg (magenta);
  - a third line which is an alternate repetition of Cy and Ye; and
  - a fourth line which is an alternate repetition of Mg and G.
4. (Original) An image pickup apparatus according to claim 2,  
wherein the synthesis means generates new signals S1r, S2r, S1b, and S2b by performing the following operations:
$$S1r = Cy + G, S2r = Ye + Mg$$
$$S1b = Cy + Mg, S2b = Ye + G$$

based on Cy (cyan), Ye (yellow), G (green), and Mg (magenta) of each pixel data in a signal whose horizontal and vertical spatial phases are synchronized in the spatial phase synchronization means.

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5. (Original) An image pickup apparatus according to claim 1,  
wherein the image pickup element is read on a frame basis by independently  
scanning odd-numbered and even-numbered lines.

6. (Currently Amended) An image pickup method for an image pickup  
apparatus provided with an image pickup element having a color coding filter, wherein the image  
pickup method comprises:

the step of generating output signals by use of a generating means based on output  
from each line in the image pickup element and outputting the same;

the step of allowing spatial phase synchronization means to synchronize  
horizontal and vertical spatial phases based on the output from each line in the image pickup  
element;

the step of allowing synthesis means to create a synthesized signal based on a  
signal whose horizontal and vertical spatial phases are synchronized in the spatial phase  
synchronization means;

the step of performing brightness processing on the ~~outputted signal~~ signals  
obtained from the means for generating signals; and

the step of performing chromaticness processing for a signal from the synthesis  
means,

wherein said outputted signals are delay signals sent to a preprocessing  
circuit containing a plurality of adders which compiles a sum of said delay signals and a  $\frac{1}{2}$   
multiplier which halves the sum compiled from said plurality of adders.

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wherein said preprocessing circuit outputs said sum halved by said  $\frac{1}{2}$   
multiplier to said step of performing brightness processing, and  
wherein said preprocessing circuit sends said delay signals as the signal  
from the synthesis means to said step of performing chromaticness processing.

7. (Original) An image pickup method according to claim 6,  
wherein the color coding filter is a complementary mosaic color coding filter.

8. (Original) An image pickup method according to claim 7,  
wherein the complementary mosaic color coding filter is based on a repetition of  
two pixels horizontally by four lines vertically, and wherein the filter comprises:

a first line which is an alternate repetition of Cy (cyan) and Ye (yellow);  
a second line which is an alternate repetition of G (green) and Mg (magenta);  
a third line which is an alternate repetition of Cy and Ye; and  
a fourth line which is an alternate repetition of Mg and G.

9. (Original) An image pickup method according to claim 7,  
wherein the synthesis means generates new signals S1r, S2r, S1b, and S2b by  
performing the following operations:

$$\begin{aligned} S1r &= Cy + G, \quad S2r = Ye + Mg \\ S1b &= Cy + Mg, \quad S2b = Ye + G \end{aligned}$$

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based on Cy (cyan), Ye (yellow), G (green), and Mg (magenta) of each pixel data in a signal whose horizontal and vertical spatial phases are synchronized in the spatial phase synchronization means.

10. (Original) An image pickup method according to claim 6,  
wherein the image pickup element is read on a frame basis by independently scanning odd-numbered and even-numbered lines.